Remarks

This Amendment is responsive to the Office Action mailed on December 18, 2002. Claims 30 to 57 are now pending. New claim 57 is the sole independent claim.

The drawings have been objected to on the ground that references 34 (Figure 1) and 72 (Figure 5) are not mentioned in the description. With respect to reference numeral 34, it is respectfully pointed out that this numeral is found in Figures 2 and 4 (not Figure 1) and is explained in the specification, e.g., on page 11, last two paragraphs and page 12, first paragraph. With respect to reference numeral 72 in Figure 5, this is indeed a mistake, caused by inadvertent error. This numeral should read "12" and not "72." A proposed drawing correction is enclosed for approval by the Examiner. Upon receiving approval, a corrected formal drawing will be submitted. In view of the above, withdraw of the objection to the drawings is respectfully requested.

Claims 29-56 stand rejected under 35 U.S.C. 112, second paragraph, as being incomplete. Independent claim 29 has been replaced with a new claim 57, and the remaining

claims have been amended as necessary to overcome this rejection. Applicants submit that one skilled in the art would clearly understand the claimed structure set forth in the new and amended claims. Accordingly, the Examiner is respectfully requested to withdraw the rejection under 35 U.S.C. 112.

Claims 29-56 also stand rejected as being obvious under 35 U.S.C. 103(a) for the reasons set forth on pages 4-9 of the Office Action. The primary reference relied on by the Examiner is U.S. patent 5,729,561 to Hironaka. Applicants respectfully traverse the obviousness rejections for the reasons set forth below.

The present invention provides a plate-like solid-state body comprising an optically pumped laser active medium, whereas Hironaka relates to a semiconductor laser chip. As will be appreciated by those skilled in the art, the semiconductor laser of Hironaka is electrically pumped; not optically pumped as is the case in Applicants' claimed structure. Thus, there is no "radiation source for optically pumping said laser active medium" in Hironaka, as required by Applicants' claim 57.

Moreover, while the Examiner is correct that Hironaka discloses a heat sink coupled to a lower electrode of a

semiconductor laser chip, it is respectfully pointed out that the lower electrode is connected to the upper electrode of the heat sink by solder. This is entirely different from Applicants' claimed use of "a cross-linked adhesive material." As is well known, solder is made of an alloy of metal, whereas a cross-linked adhesive layer is made of an organic polymer. See, e.g., the definition of "cross-linking" in the *McGraw-Hill Dictionary of Scientific and Technical Terms*, Fifth Edition, ©1994 (copy enclosed):

> **cross-linking** [ORG CHEM] The setting up of chemical links between the molecular chains of polymers.

It appears that the Examiner may have been confused by Hironaka's use of the term "adhesive layer 8" in the last line of column 9 to the first line of column 10 of the patent. However, a careful reading of the patent indicates that reference numeral 8 is actually the "solder layer." There is simply no disclosure of an adhesive layer anything like that claimed by Applicants, and a solder layer is clearly not such an adhesive layer. Thus, Hironaka does not even remotely disclose, and would not render obvious, a laser amplifying system as claimed by Applicants wherein, *inter alia*,

- a radiation source *optically pumps* a laser active medium, to generate an amplified radiation field for output from a solid-state body,
- the solid-state body being coupled to a support surface of a cooling member *via an adhesive* that comprises a *cross-linked adhesive material.*

Further, the basic concept of Hironaka is entirely different from that of the present invention. In particular, Hironaka's idea is to avoid direct contact between the heat sink and the lower electrode of the semiconductor laser chip in a region around the centerline of the light emitting region in order to avoid thermal expansion problems. This concept is the opposite of the present invention, which provides an adhesive layer exactly below the light emitting region of the plate-like solid-state body. See, e.g., Applicants' claims 32 and 33.

U.S. Patent 5,766,277 ("DeVoe et al.") has been cited by the examiner as a secondary reference. It is respectfully submitted that DeVoe et al. is so technically remote from the present invention that one skilled in the art would not look to this reference for assistance in developing a laser amplifying system. In particular, DeVoe

et al. is concerned with a coated abrasive article (e.g., for metalworking) and has nothing to do with laser optics or the mounting of a solid-state body onto a cooling member. Thus, one skilled in the art would not be expected to combine the teachings of DeVoe et al. and Hironaka.

Okoshi et al. U.S. Patent 5,665,473 has also been cited as a secondary reference. Applicants respectfully submit that Okoshi et al. is not relevant to the present invention, because this reference teaches the provision of an elastic layer having a "rubberlike elasticity" between several lead frames (column 4, line 34). The *elastic* layer does *not* provide an optimized heat transfer, as is provided by the *stiff fixing* of the plate-like solid-state body of the present invention. Okoshi et al. is also not concerned with fixing a very sensitive and fragile solid-state body on a cooling member. Thus, Okoshi et al. is not seen as being relevant to the present invention, and would not provide any motivation to arrive at a structure as claimed by Applicants.

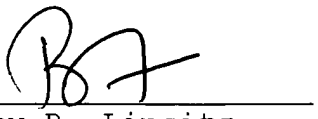
In view of the above, Applicants claimed structure is not believed to be rendered obvious by any of the prior art of record, taken alone or in combination. Each of

presently pending claims 30-57 is therefore believed to be in immediate condition for allowance.

Further remarks regarding the asserted relationship between Applicants' claims and the prior art are not deemed necessary, in view of the amended claims and the foregoing discussion. Applicants' silence as to any of the Examiner's comments is not indicative of an acquiescence to the stated grounds of rejection.

The Examiner is respectfully requested to reconsider this application, allow each of the presently pending claims, and to pass this application on to an early issue. If there are any remaining issues that need to be addressed in order to place this application into condition for allowance, the Examiner is requested to telephone Applicant's undersigned attorney.

Respectfully submitted,



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from the airway to the gangway, or from one breast through the pillar to the adjoining working. Also known as cross gateway; cross hole; headway. { 'krȯs ˌhed·iŋ }

cross hole *See* cross heading. { 'krȯs ˌhōl }

crossing angle [NAV] The angle at which two lines of position intersect. Also known as angle of cut. { 'krȯs·iŋ ˌaŋ·gəl }

crossing barrier [GEN] Any of the genetically controlled mechanisms that either prevent or significantly reduce the ability of individuals in a population to hybridize with individuals of other populations. { 'krȯs·iŋ ˌbar·ē·ər }

crossing-over [GEN] The exchange of genetic material between paired homologous chromosomes during meiosis. Also known as crossover. { ˌkrȯs·iŋ 'ō·vər }

crossing-over map [GEN] A genetic map made by utilizing the frequency of crossing-over as a measure of the relative distances between genes in one linkage group. { ˌkrȯs·iŋ 'ō·vər ˌmap }

crossing-over unit [GEN] A frequency of genetic exchange of 1% between two pairs of linked genes. { ˌkrȯs·iŋ 'ō·vər ˌyü·nət }

crossing-over value [GEN] The frequency of crossing-over between two linked genes. { ˌkrȯs·iŋ 'ō·vər ˌval·yü }

crossing plates [CIV ENG] Plates placed between a crossing and the ties to support the crossing and protect the ties. { 'krȯs·iŋ ˌplāts }

crossing symmetry [PARTIC PHYS] The amplitude for a process that involves creation of a particle with four-momentum P_μ is equal to the amplitude for a process which is the same except it involves destruction of the antiparticle with four-momentum $-P_\mu$. { 'krȯs·iŋ ˌsim·ə·trē }

cross joint [GEOL] A fracture in igneous rock perpendicular to the lineation caused by flow magma. Also known as transverse joint. { 'krȯs ˌjȯint }

cross-lamination [GEOL] *See* cross-bedding. [MATER] Construction of a laminated composite material so that some layers are oriented at right angles to the other layers with respect to the grain or the strongest direction in terms of tension. { ˌkrȯs lam·ə'nā·shən }

crosslap joint [BUILD] A joint in which two wood members cross each other; half the thickness of each is removed so that at the joint the thickness is the same as that of the individual members. { 'krȯsˌlap ˌjȯint }

cross-level [ENG] To level at an angle perpendicular to the principal line of sight. { 'krȯs ˌlev·əl }

crossline screen [GRAPHICS] In halftone photography, a grid that has opaque lines intersecting at right angles, forming transparent squares (screen apertures). Also known as a glass screen. { 'krȯsˌlīn ˌskrēn }

cross-link [MOL BIO] A covalent linkage between the complementary strands of deoxyribonucleic acid (DNA) duplex or between bases of a single strand of DNA. { 'krȯs ˌliŋk }

cross-linking [ORG CHEM] The setting up of chemical links between the molecular chains of polymers. { 'krȯs ˌliŋk·iŋ }

cross-magnetizing effect [ELECTROMAG] The distortion in the flux-density distribution in the air gap of an electric rotating machine caused by armature reaction. { ˌkrȯs 'mag·nəˌtīz·iŋ i'fekt }

crossmarks [GRAPHICS] Register marks used for the exact positioning of images in step-and-repeat, double, or multicolor printing; also used for superimposing overlays onto a base or onto each other. { 'krȯsˌmärks }

cross matching [IMMUNOL] Determination of blood compatibility for transfusion by mixing donor cells with recipient serum, and recipient cells with donor serum, and examining for an agglutination reaction. { 'krȯs ˌmach·iŋ }

cross modulation [COMMUN] A type of interference in which the carrier of a desired signal becomes modulated by the program of an undesired signal on a different carrier frequency; the program of the undesired station is then heard in the background of the desired program. { ˌkrȯs ˌmäj·ə'lā·shən }

cross multiplication [MATH] Multiplication of the numerator of each of two fractions by the denominator of the other, as when eliminating fractions from an equation. { ˌkrȯs ˌməl·tə·plə'kā·shən }

cross-neutralization [ELECTR] Method of neutralization used in push-pull amplifiers, whereby a portion of the plate-cathode alternating-current voltage of each vacuum tube is applied to the grid-cathode circuit of the other vacuum tube through a neutralizing capacitor. { ˌkrȯs ˌnü·trə·lə'zā·shən }

cross office switching time [COMMUN] Time required to connect any input through the switching center to any selected output. { 'krȯs ˌȯf·əs 'swich·iŋ ˌtīm }

Crossopterygii [PALEON] A subclass of the class Osteichthyes comprising the extinct lobefins or choanate fishes and represented by one extant species; distinguished by two separate dorsal fins. { krä,säp·tə'rij·ē,ī }

Crossosomataceae [BOT] A monogeneric family of xerophytic shrubs in the order Dilleniales characterized by perigynous flowers, seeds with thin endosperm, and small, entire leaves. { ˌkrä·səˌsō·məˈtās·ē,ē }

crossover [CIV ENG] **1.** An S-shaped section of railroad track joining two parallel tracks. **2.** A connection between two pipes in the same water supply system or a connection between two water supply systems. [ELEC] A point at which two conductors cross, with appropriate insulation between them to prevent contact. [ELECTR] The plane at which the cross section of a beam of electrons in an electron gun is a minimum. [ENG] The portion of a draw works' drum containing grooves for angle control so the wire rope can cross over to begin a new wrap. [GEN] *See* crossing over. { 'krȯsˌō·vər }

crossover distortion [ELECTR] Amplitude distortion in a class B transistor power amplifier which occurs at low values of current, when input impedance becomes appreciable compared with driver impedance. { 'krȯsˌō·vər dis'tȯr·shən }

crossover experiment [MED] An experiment or clinical investigation in which subjects are divided randomly into at least as many groups as there are kinds of treatment to be given, and then the groups are interchanged until every subject has received each treatment. { 'krȯsˌō·vər ik'sper·ə·mənt }

crossover flange [ENG] Intermediate pipe flange used to connect flanges of different working pressures. { 'krȯsˌō·vər ˌflanj }

crossover frequency [ENG ACOUS] **1.** The frequency at which a dividing network delivers equal power to the upper and lower frequency channels when both are terminated in specified loads. **2.** *See* transition frequency. { 'krȯsˌō·vər ˌfrē·kwən·sē }

crossover joint [PETRO ENG] A casing length with different threads at either end to permit a change from one thread to another in a casing string. { 'krȯsˌō·vər ˌjȯint }

crossover length [MATH] A length characteristic of a fractal network such that at scales which are small compared with this length the fractal nature of the structure is manifest in its dynamics, whereas at scales which are large compared with this length the dynamics resemble those of a crystalline structure. { 'krȯsˌō·vər ˌleŋkth }

crossover network [ENG ACOUS] A selective network used to divide the audio-frequency output of an amplifier into two or more bands of frequencies. Also known as dividing network; loudspeaker dividing network. { 'krȯsˌō·vər ˌnetˌwərk }

crossover spiral *See* lead-over groove. { 'krȯsˌō·vər ˌspī·rəl }

crossover voltage [ELECTR] In a cathode-ray storage tube, the voltage of a secondary writing surface, with respect to cathode voltage, on which the secondary emission is unity. { 'krȯsˌō·vər ˌvōl·tij }

cross-peen hammer [ENG] A hammer with a wedge-shaped surface at one end of the head. { 'krȯs ˌpēn 'ham·ər }

cross-pointer indicator [NAV] A flight instrument having two needles which cross in the center when the aircraft is on course; the vertical needle indicates the position of the aircraft with respect to the localizer course, and the horizontal needle serves a similar purpose for the glide slope of an instrument landing system. { 'krȯs ˌpȯint·ər ˌin·dəˌkād·ər }

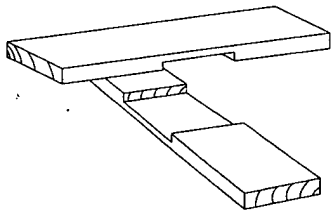
cross-polarization [ELECTROMAG] The component of the electric field vector normal to the desired polarization component. { ˌkrȯs ˌpō·lə·rə'zā·shən }

cross-pollination [BOT] Transfer of pollen from the anthers of one plant to the stigmata of another plant. { ˌkrȯs ˌpä·lə,nā·shən }

cross product [MATH] **1.** An anticommutative multiplication on the vectors of euclidean three-dimensional space. Also known as vector product. **2.** The product of the two mean terms of a proportion, or the product of the two extreme terms; in the proportion $a/b = c/d$, it is ad or bc. { 'krȯs ˌprä·dəkt }

cross ratio [MATH] For four collinear points, A, B, C, and D, the ratio $(AB)(CD)/(AD)(CB)$, or one of the ratios obtained from this quantity by a permutation of A, B, C, and D. { 'krȯs ˌrā·shō }

CROSSLAP JOINT



Two wood members connected by a crosslap joint.